# FACT SHEET

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### New Technology Enablers for the Republic of Singapore Air Force's Smart Airbase of the Future

1.      The Republic of Singapore Air Force (RSAF) has taken steps in its transformation to become a future-ready Air Force with the smart airbase developments. Apart from existing initiatives, the RSAF continues to explore and leverage on advancements in technology to enhance effectiveness and efficiency in its base operations. The strong ops-tech partnership with the Defence Science and Technology Agency (DSTA) has supported the RSAF in the continued development of its smart airbase of the future to enhance air power generation for the Singapore Armed Forces (SAF).

**RSAF's Smart Airbase of the Future**

2.      The RSAF's smart airbase of the future taps on fourth industrial revolution technologies to enable the RSAF to operate more effectively in a high operational tempo and increasingly complex environment. Specifically, advancements in robotics, data analytics (DA) and artificial intelligence (AI) open new possibilities for the RSAF to be more agile, resilient and efficient in air power generation. The envisaged smart airbase will be highly networked, dynamic and more sustainable, contributing to a reduction in carbon emission through the use of electric vehicles and drones in base operations. The initiatives will be progressively implemented upon successful trials as the RSAF continues to develop its smart airbase of the future.

**Continued Developments in the RSAF's Smart Airbase**

3.      Enhanced Munitions Loading for Fighter Aircraft. The enhanced munitions loader reduces the manpower and time required to arm the RSAF's fighter aircraft with munitions for timely air defence responses. The enhanced loader requires only one personnel to operate as compared to the current three-men loading team, providing manpower savings of up to 66%. Harnessing new technology enablers like DA and robotics, the enhanced munitions loader allows for better performance, greater precision as well as efficiency in munitions loading. Equipped with omni-directional Mecanum wheels, the enhanced munitions loader is

highly manoeuvrable in tight spaces such as aircraft hangars. Following the completion of trials, the enhanced munitions loader is expected to be deployed for operations this year.



4.　　Automated Logistics and Personnel Transportation. The RSAF and DSTA continues to conduct trials using commercial off-the-shelf Automated Vehicles (AVs) for airbase transportation to optimise manpower resources and provide greater convenience for personnel. The AVs' self-driving technology allows for the unmanned transportation of logistical supplies and personnel in the airbase. Apart from pre-programmed routes, a mobile application will be developed to provide users with on-demand ferry services to enhance efficiency in transportation within the airbase.



5.　　Expeditious Runway Damage Assessment and Repairs. The RSAF and DSTA are conducting trials on the use of multiple self-organised drones to reduce the manpower and time taken for runway damage assessments while enhancing safety of personnel. In comparison to manual checks which requires more manpower and the physical presence of personnel, an operator can remotely control multiple self-organised drones to conduct runway damage assessment expeditiously and safely. Incorporated with AI, the drones are able to detect and classify the extent of runway damages (e.g. in accordance to the size of the crater), and share the data collected real-time to enhance situational awareness and information accuracy. Decision Support Systems will process the data, prioritise runway repair operations, and provide an optimal solution to ensure that airpower generation requirements

are met effectively and efficiently. In addition, DSTA integrated an algorithm that allows drones to coordinate their routes autonomously, and re-organise themselves in the event of system contingencies (e.g. battery failure) to continue with its assigned task, thus enhancing its overall robustness.



6.  <u>Enhanced Airbase Security</u>. The RSAF also plans to conduct trials to utilise self-organised drones for perimeter patrol to detect intrusions and suspicious activities to enhance the security of RSAF's airbases. These drones will harness AI technologies and be capable of detecting, identifying and tracking targets, and providing a real-time situational display through a live video feed. Operating alongside security troopers, the use of these drones will enhance information accuracy and efficiency in airbase security operations. In addition, multiple drones will be controlled remotely by a single personnel thus optimising manpower resources and allocation of our security troopers.
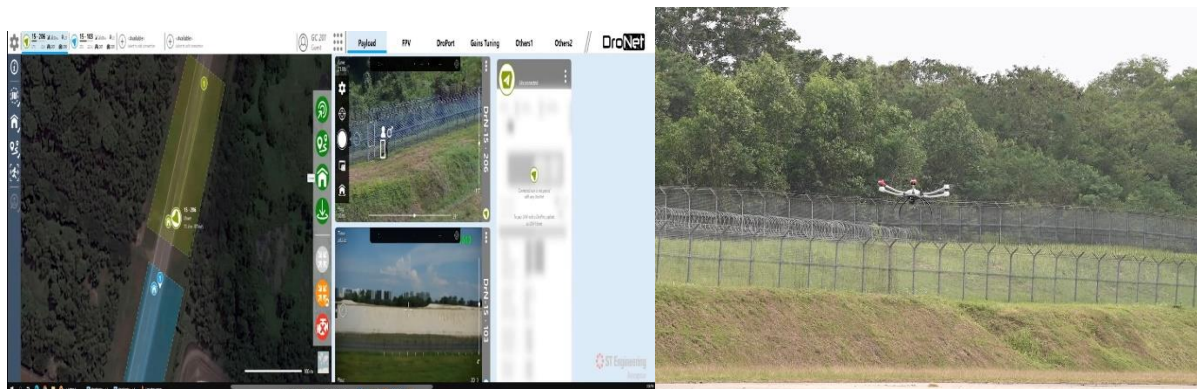


7.  <u>Automated Inspection and Proactive Maintenance</u>. The RSAF continues to develop its automated aircraft inspection system to reduce aircraft turnaround time and the workload on the RSAF's aircraft engineers. The sensors in the aircraft hangars are enhanced with improved AI algorithms to better detect and classify defects, and the Unmanned Ground Vehicles (UGVs) have commenced trials for aircraft inspection. Equipped with DA technologies, the RSAF is planning for future trials and implementation on the Smart Fleet Management System for improved insights on aircraft performance and pre-emptive maintenance actions.

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